

and detailed report of the tornado, with sketches and charts illustrating its prominent features, has been made by Sergeant J. M. Cline, Signal Corps, observer at Abilene, Tex.

9th. Kansas.—Wichita: high wind, accompanied by snow, prevailed; maximum velocity of wind, 30 miles per hour at 10 a. m., from the north, and at 2.35 p. m., from the northwest. Street cars were unable to run; business was generally interrupted; telegraph lines were reported down in all directions, and railroad trains were delayed. **Missouri.**—Kansas City: a snow storm caused much damage to telegraph and telephone wires. It is stated that this was the severest snow storm that

has occurred in this section so early in the season in many years.

10-11th. Michigan.—Detroit: a severe sleet and hail storm, moving from northwest to southeast, occurred during the night. The storm, which began and ended quite abruptly, seemed to pass in streaks, as in some parts of the city no hail or sleet fell.

23d-24th. Arizona.—Globe, Gila Co.: the storm which passed over this place is reported as the severest November storm in that section of which there is a record; 2.99 inches of rain fell in twenty-four hours.

INLAND NAVIGATION.

In the following table are shown the danger-points at the various stations; the highest and lowest depths for November, 1888, with the dates of occurrence and the monthly ranges:

Heights of rivers above low-water mark, November, 1888 (in feet and tenths).

Stations.	Danger-point on gauge.	Highest water.		Lowest water.		Monthly range.
		Date.	Height.	Date.	Height.	
<i>Red River:</i>						
Shreveport, La.	29.9	28-29	7.2	4, 5, 6	0.6	6.6
<i>Arkansas River:</i>						
Fort Smith, Ark. ...	22.0	21	5.9	6, 7	1.1	4.8
Little Rock, Ark. ...	23.0	22	8.6	2, 3	1.9	6.7
<i>Missouri River:</i>						
Leavenworth, Kans. ...	20.0	11	5.9	29	5.0	0.9
Kansas City, Mo. ...	21.0	10, 11, 12	6.5	28, 29, 30	5.8	0.7
<i>Mississippi River:</i>						
Saint Paul, Minn. ...	14.5	4, 5, 6, 7	3.7	18-19	2.4	1.3
La Crosse, Wis.	24.0	3, 4, 5, 6	3.9	27-30	2.9	1.0
Dubuque, Iowa.	16.0	5, 6, 10, 11	3.8	28-29	3.0	0.8
Davenport, Iowa. ...	15.0	11-12	2.7	28, 29-30	1.9	0.8
Keokuk, Iowa.	14.0	13	3.0	1	1.4	1.6
Saint Louis, Mo. ...	32.0	16	9.0	5	5.1	3.9
Cairo, Ill.	40.0	17	31.5	1	19.0	12.5
Memphis, Tenn.	34.0	19	25.1	1	13.0	12.1
Vicksburg, Miss. ...	41.0	24-25	28.9	1	8.0	20.9
New Orleans, La. ...	13.0	29-30	8.9	5, 6, 7	3.2	5.7
<i>Ohio River:</i>						
Pittsburgh, Pa.	22.0	16	12.3	30	4.1	8.2
Parkersburg, W. Va. ...	38.0	12	17.8	25	2.5	20.3
Cincinnati, Ohio. ...	50.0	10	34.0	30	17.6	16.4
Louisville, Ky.	25.0	10	14.9	30	8.4	6.5
<i>Cumberland River:</i>						
Nashville, Tenn. ...	40.0	13	26.5	7	6.4	20.1
<i>Tennessee River:</i>						
Chattanooga, Tenn. ...	33.0	12	21.0	8	5.4	15.6
<i>Monongahela River:</i>						
Pittsburgh, Pa.	29.0	16	12.3	30	4.1	8.2
<i>Savannah River:</i>						
Augusta, Ga.	32.0	11	24.5	3, 4-7	9.4	15.1
<i>Willamette River:</i>						
Portland, Oregon. ...	15.0	6	4.6	30	0.5	4.1

Oswego, N. Y., 2d: ice formed on the canal, between this city and Syracuse, during the past twenty-four hours, detaining boats several hours.

Dubuque, Iowa, 6th: navigation on the Mississippi River closed on this date.

Cairo, Ill., 13th: heavy drift-wood passed down the Ohio River up to this date, causing considerable damage to the steel bridge, tearing away its false work, and causing a loss of about \$2,000.

Fort Totten, Dak.: thick ice formed along the shores of

Devil's Lake on the 15th, and the lake froze over on the 16th, closing navigation for the season.

Fort Sully, Dak., 16th: the Missouri River is rapidly icing over, and navigation may be considered closed for the winter.

Fort Buford, Dak.: the Missouri River was full of floating ice on the 17th and 18th, and on the 19th was frozen over; it remained partially open until the 30th, when it was entirely frozen over.

Bismarck, Dak., 20th: the Missouri River is at an extremely low stage, with considerable slush ice.

Fort Huron, Mich., 26th: navigation on the Saint Clair River is practically closed for the season.

FLOODS.

Seymour, Jackson Co., Ind., 10th: it has been raining here steadily for forty-eight hours; the White and Mascaticutuck rivers have overflowed their banks, and the low-lying lands are inundated. Much live stock has been drowned, and quantities of corn have been swept away.

HIGH TIDES.

Hatteras, N. C., 24th; Key West, Fla., Norfolk, Va., 26th; Wood's Holl, Mass., 25th to 27th. Atlantic City, N. J.: the high wind of the 25th and 26th caused the tide to rise to an unusual height, doing much damage to property. Kitty Hawk, N. C., 24th: a severe storm has continued since 7 a. m. of the 20th; the wind blowing from the northeast until 3 p. m. of the 24th, when it backed to north and continued steady at about sixty miles per hour. The tide in Currituck Sound was lower than ever before known. At Kitty Hawk wharf, where there is usually enough water for small steamers and sailing vessels, the water receded about seventy-five feet from the wharf. Between Nag's Head and New Inlet, a distance of about twenty-one miles, the entire "banks" were flooded by the tide, and all cattle on this low beach perished.

New London, Conn., 26th: the tide in the afternoon was about four feet above the usual high water mark. In consequence, several of the wharves were partially submerged. No serious damage followed. The Signal Service observer reports that this was the highest tide observed in twenty-five years.

LOW TIDE.

Kitty Hawk, N. C., 24th; Cedar Keys, Fla., 10th to 12th.

ATMOSPHERIC ELECTRICITY.

AUORAS.

Faint auroral displays were observed as far south as Lake Forest, Ill. They were most frequently noted at Saint Vincent, Minn., and were reported on from two to three dates in New England, south-central New York, the upper lake region, and the upper Mississippi and Missouri valleys.

At Fort Buford, Dak., an aurora was observed at 9.48 p. m. of the 5th, consisting of a diffused white light which rose to an altitude of 10° and covered 75° of the horizon; the aurora attained its maximum intensity at 10.30 p. m., when streamers

rose to an altitude of 60°, above which a faint arch was visible. The display gradually faded away, and had entirely disappeared at 3.55 a. m. of the 6th.

Auroras were observed during the month, as follows: 1st, Pontiac, Mich.; 4th, Cornish, Me.; 5th, Fort Buford, Fort Sully, and Webster, Dak.; Hanover, N. H.; 6th, Fort Buford, Dak.; Escanaba and Traverse City, Mich.; 7th, Saint Vincent, Minn.; 10th, Lake Forest, Ill.; 12th, Nashua, N. H.; 13th, Wedgewood, N. Y.; 16th, Saint Vincent, Minn.; 17th, Madison, Wis.; 25th, Davenport and Webster, Dak.; Saint